

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/14386

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G 07 F 7/00; G 06 F 17/00
US CL : 364/479.01; 194/206

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 364/479.01; 194/206

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS, search terms; vending, telephone, payphone

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X, P -----	US, A, 5,450,938 (RADEMACHER) 19 September 1995, figures 1 and 3, columns 3-6.	1-3, 5-11 -----
Y, P		4 and 12-34
Y	US, A, RE. 32,115 (LOCKWOOD ET AL.) 15 April 1986, columns 5-6.	1-34
Y	US, A, 4,412,292 (SEDAM ET AL.) 25 October 1983, columns 6-9.	1-34
A	US, A, 5,132,915 (GOODMAN) 21 July 1992, figure 2	1-34
A	US, A, 4,818,854 (DAVIES ET AL.) 04 April 1989, figure 1.	1-34

Further documents are listed in the continuation of Box C. See patent family annex.

Special categories of cited documents:	
A	document defining the general state of the art which is not considered to be of particular relevance
E	earlier document published on or after the international filing date
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P	document published prior to the international filing date but later than the priority date claimed
T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
X	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
Y	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
Z	document member of the same patent family

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Form PCT/ISA/210 (second sheet)(July 1992)*

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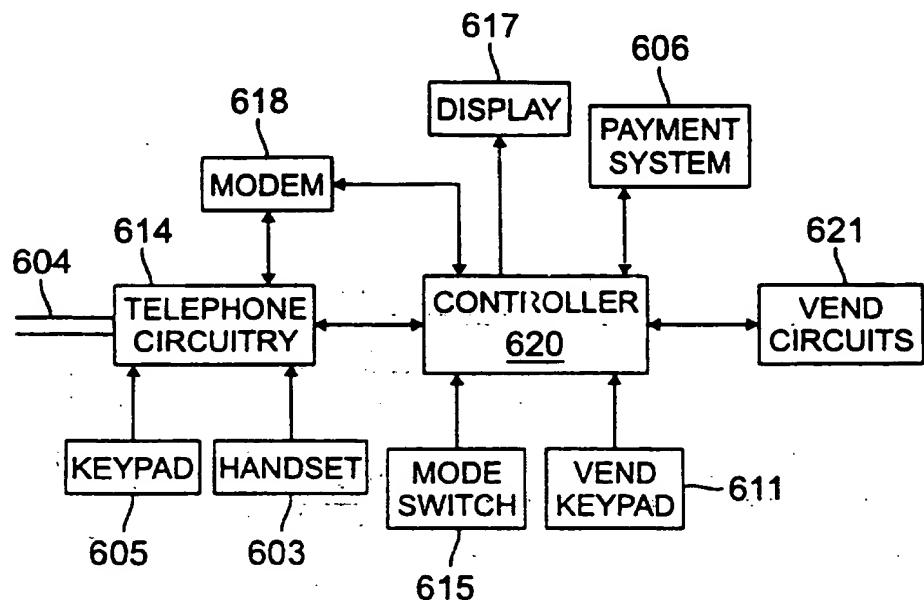


FIG. 6A

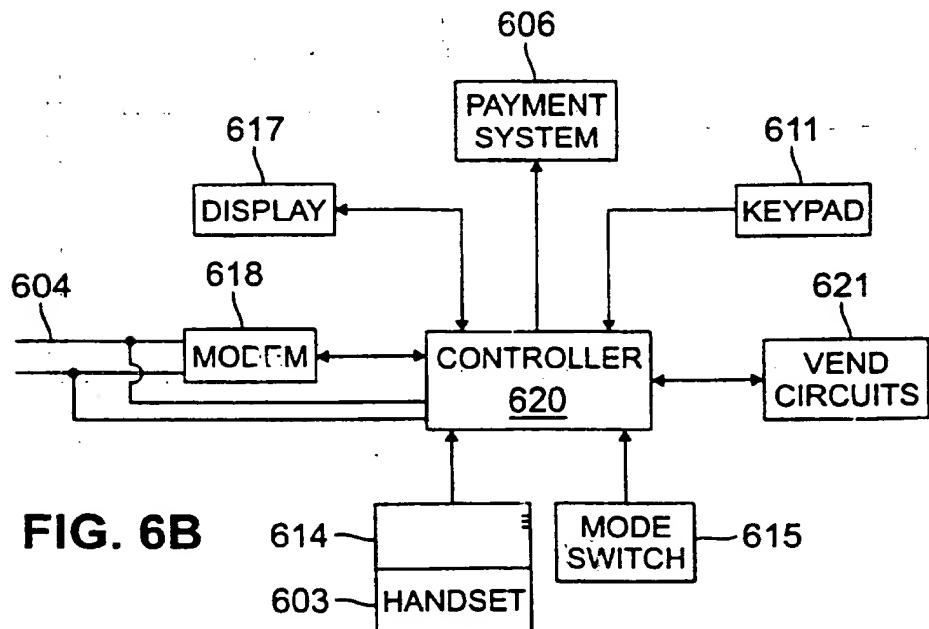
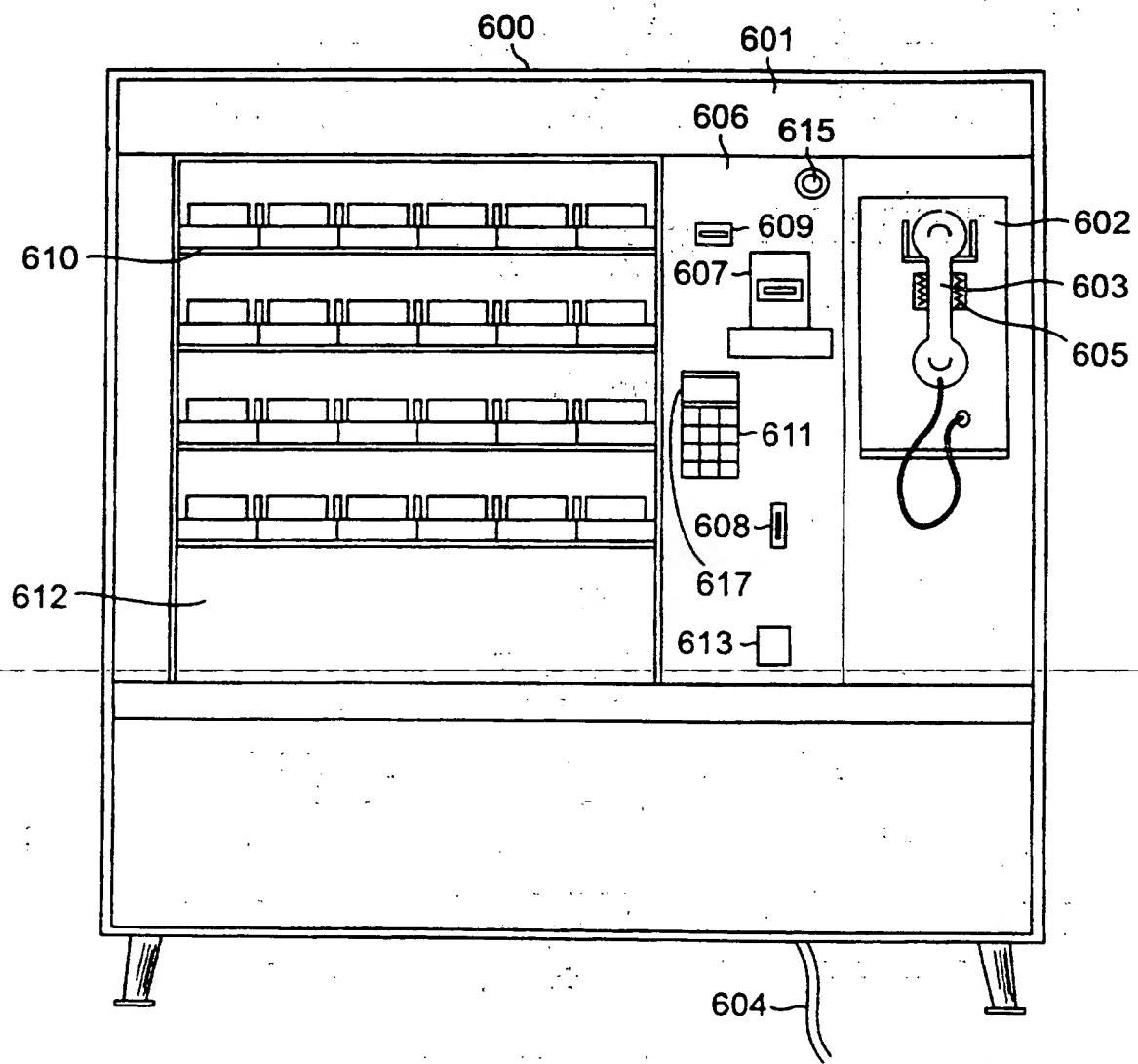


FIG. 6B

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**FIG. 5****SUBSTITUTE SHEET (RULE 26)**

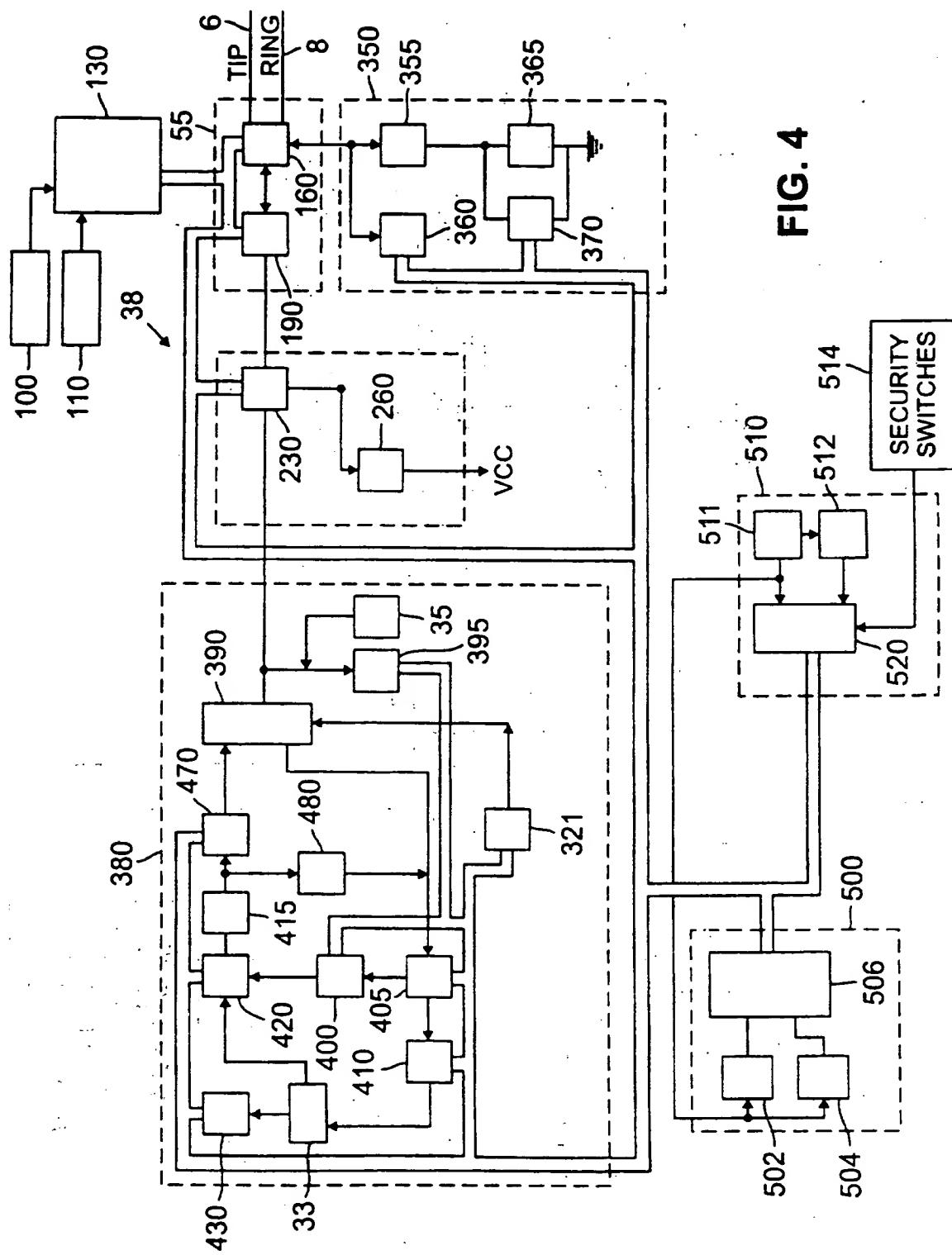


FIG. 4

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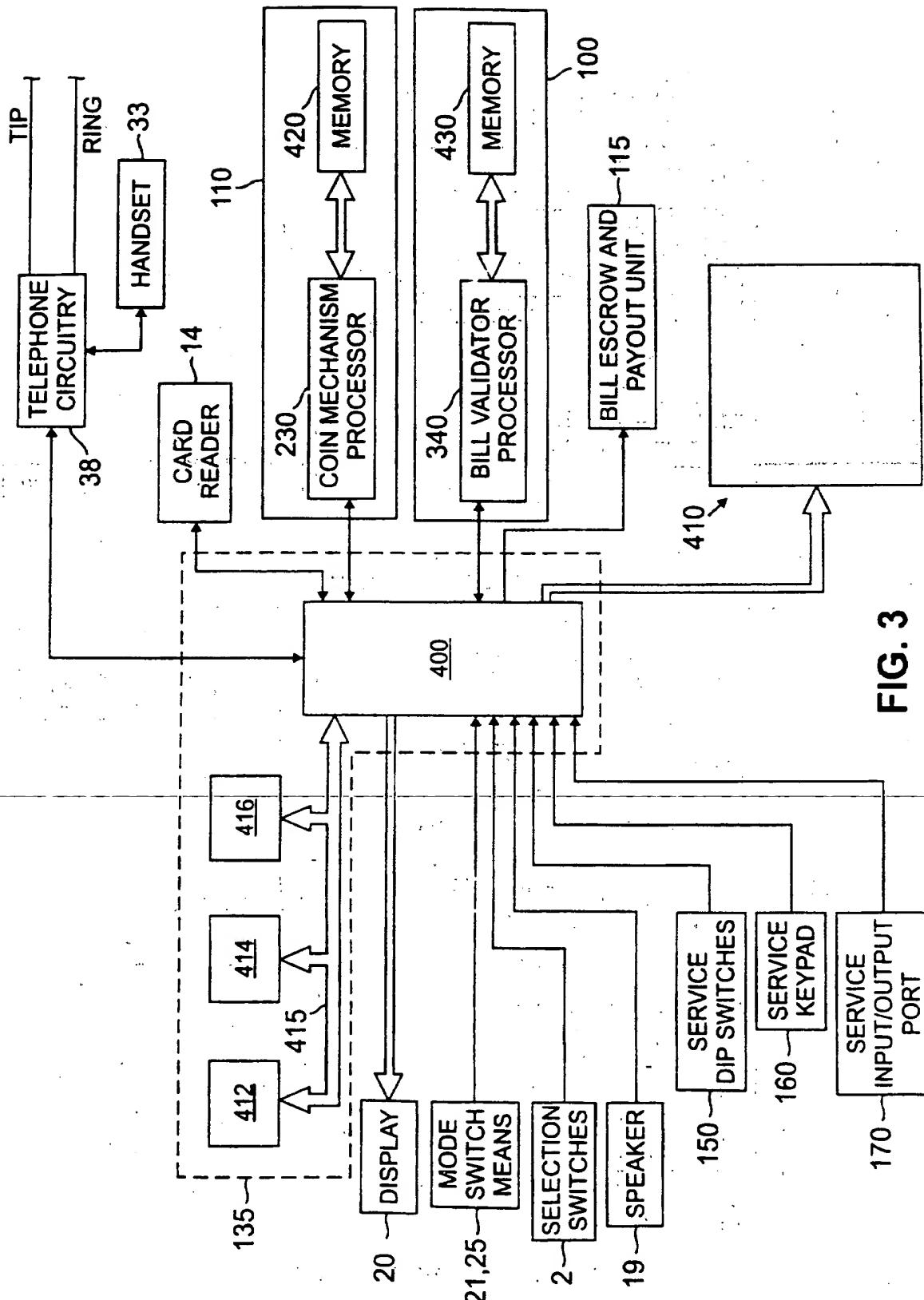
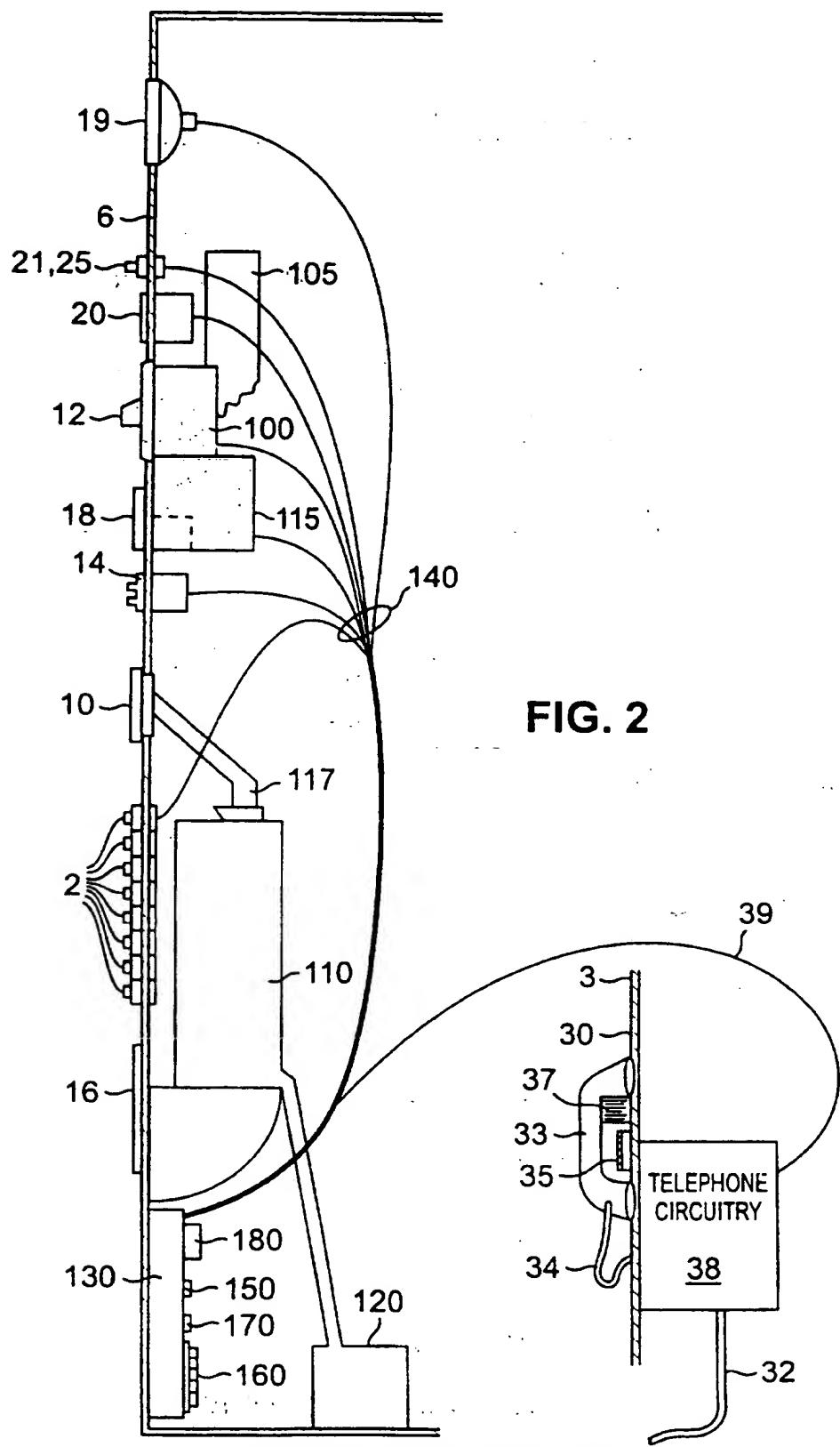


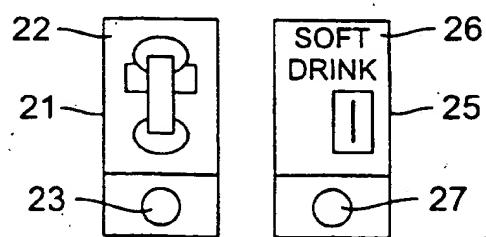
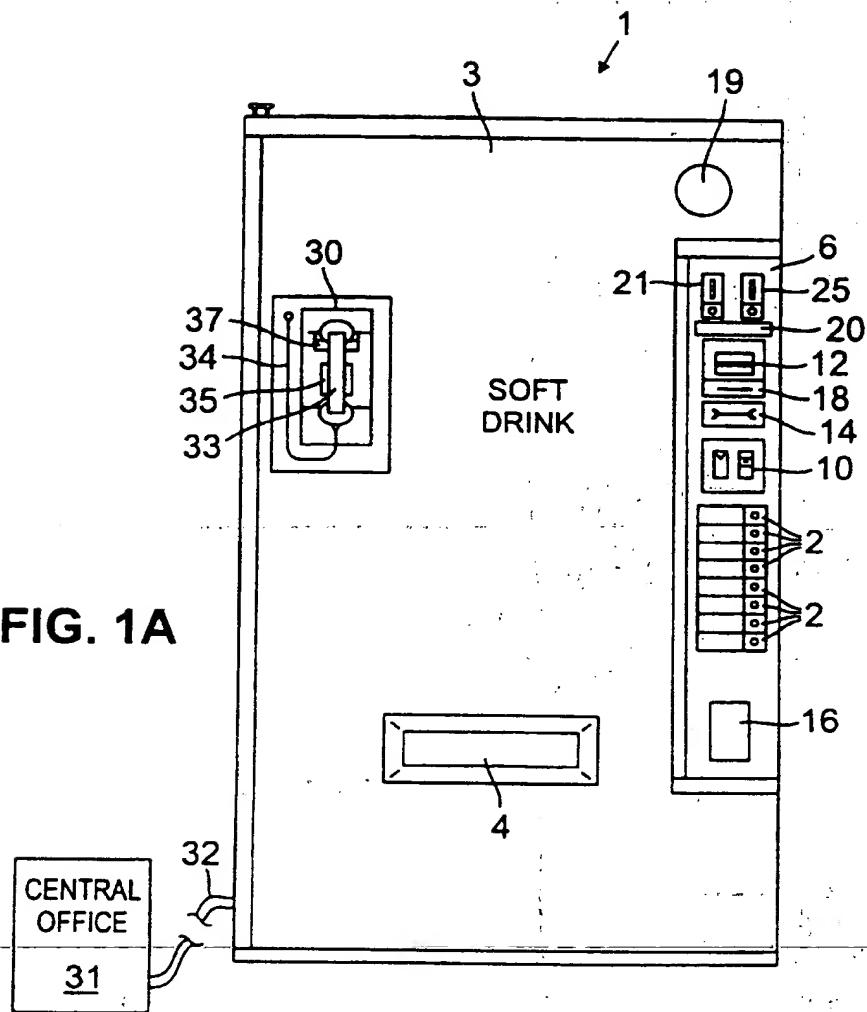
FIG. 3

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**SUBSTITUTE SHEET (RULE 26)**

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31. A method for operating a vending machine and payphone apparatus, comprising:

requiring depression of at least one mode selection means to initiate either a payphone or vend 5 operation;

operating in a payphone mode if selected by a consumer;

accepting payment for a telephone call;

connecting the call if sufficient credit has 10 accrued;

operating in a vending mode if selected; and

performing a vend operation if sufficient credit has accrued for a selection.

32. The method of claim 31, further comprising:

15 performing payphone audit functions utilizing a first telephone number.

33. The method of claim 31, further comprising:

performing vending machine audit functions utilizing a second telephone number.

20 34. The method of claim 31, further comprising:

performing vending machine and payphone audit functions utilizing a single telephone number.

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operating in a payphone mode if the handset
is off-hook;

accepting payment for a telephone call;

monitoring a mode switch means if the handset
5 is off-hook;

accepting payment as credit towards a vend
operation if the mode switch means was depressed while
keeping track of payphone billing data;

10 performing a vend operation after sufficient
credit has accrued and an item selection has been made;

paying out change if necessary; and

operating in the payphone mode after the vend
cycle has been completed.

26. The method of claim 27, further comprising:

15 performing payphone audit functions utilizing
a first telephone number.

29. The method of claim 27, further comprising:

performing vending machine audit functions
utilizing a second telephone number.

20 30. The method of claim 27, further comprising:

performing vending machine and payphone audit
functions utilizing a single telephone number.

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23. The method of claim 22, further comprising:
monitoring a mode switch means if the handset
is off-hook;

5 operating in a vend mode if the mode switch
means has been depressed while the handset is off-hook;
and

operating in the payphone mode if the
payphone is still in use after a vend operation has
completed.

10 24. The method of claim 22, further comprising:
performing payphone audit functions utilizing
a first telephone number.

25. The method of claim 22, further comprising:
performing vending machine audit functions
15 utilizing a second telephone number.

26. The method of claim 22, further comprising:
performing vending machine and payphone audit
functions utilizing a single telephone number.

27. A method for operating a vending machine and
20 payphone apparatus, comprising:

determining if the telephone handset is off-
hook;

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18. The apparatus of claim 12, wherein the payphone components comprise:

a switchhook; and

a controller.

5

19. The apparatus of claim 12, wherein the money acceptance means comprises:

a paper currency validator.

20. The apparatus of claim 12, wherein the money acceptance means comprises:

10

a coin validator.

21. The apparatus of claim 12, wherein the money acceptance means comprises:

a card reader.

22. A method for operating a vending machine and
15 payphone apparatus, comprising:

determining if the telephone handset is off-hook;

operating in a payphone mode if the handset is off-hook; and

20

operating in a vend mode if the handset is on-hook.

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13. The apparatus of claim 12, further comprising:

at least one mode switch operable by a consumer to switch the apparatus between a telephone mode 5 and a vend mode.

14. The apparatus of claim 13, wherein the controller applies credit toward a telephone call or a vend operation depending upon the mode chosen by a consumer.

10 15. The apparatus of claim 12, further comprising:

a display connected to the controller, operable to present information.

15 16. The apparatus of claim 12, wherein the telephone line is utilized both to place a telephone call and to perform audit functions.

17. The apparatus of claim 12, wherein the vending machine circuitry comprises:

20 a power supply; and
vending actuators.

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9. The apparatus of claim 1, wherein the money acceptance means comprises:

a coin validator.

10. The apparatus of claim 1, wherein the money acceptance means comprises:

a card reader.

11. The apparatus of claim 1, wherein the telephone line is utilized both to place a telephone call and to perform audit functions.

10 12. A vending machine and payphone apparatus, comprising:

a housing;

a payphone handset attached to the housing;

a controller contained within the housing;

15 vending machine circuitry connected to the controller;

payphone components connected to the controller;

a keypad connected to the controller;

20 a modem connected to the controller;

a telephone line connected to the modem; and

money acceptance means for accepting payment to enable a telephone call operation or a vend operation.

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4. The apparatus of claim 1, further comprising:
an audio indicator connected to the housing
and the controller for providing audible information.

5 5. The apparatus of claim 1, further comprising:
a display connected to the controller,
operable to present information.

6. The apparatus of claim 1, wherein the vending
machine circuitry comprises:

10 a power supply; and
vending actuators.

7. The apparatus of claim 1, wherein the
payphone circuitry comprises:

15 a telephone line interface circuit connected
to the telephone line;
a controller;
an audio network;
a keypad; and
a power supply.

20 8. The apparatus of claim 1, wherein the money
acceptance means comprises:

a paper currency validator.

I claim:

1. A vending machine and payphone apparatus, comprising:

a housing;

5 a payphone handset attached to the housing; a controller contained within the housing; vending machine circuitry connected to the controller;

a selection means connected to the 10 controller;

payphone circuitry attached to the controller;

a telephone line connected to the payphone circuitry; and

15 money acceptance means for accepting payment to enable a telephone call operation and/or a vend operation.

2. The apparatus of claim 1, further comprising:

20 at least one mode switch operable by a consumer to switch the apparatus between a telephone mode and a vend mode.

3. The apparatus of claim 2, wherein the controller applies credit toward a telephone call or a vend selection depending upon the mode chosen by a 25 consumer.

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calling cards and other credit/debit cards would be usable for phone calls as in any standard payphone. Further, the opportunity to use credit or verified debit payment for vending exists as the phone line can be used 5 for verification.

It should be apparent that housing the vending machine and payphone components together in one apparatus provides many benefits and advantages. In particular, cost savings are realized due to the use of a common 10 mechanical housing, common payment means, common collection of payment and common servicing, the optimization of an audit system for both the vending machine and payphone, and a reduction in service calls for the payphone. Further, enhanced revenues should be 15 realized due to payphone availability in high usage locations, increased consumer attraction, the use of paper currency to place phone calls, and the capability of change payback for phone calls. Yet further, optimization of vending machine articles in stock can be 20 realized due to the cost-effective on-line audit capabilities presented by the invention. Of course, other benefits and advantages will be apparent to those skilled in the art.

It should be understood that the above-described 25 embodiments are merely illustrative and that many variations can be devised by those of skill in the art without departing from the invention.

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performed through the use of one phone number, and vending machine audit is performed through the use of a second telephone number. Such a system may help to simplify billing for audit services since the payphone 5 may be owned by one entity while the vending machine is owned by another. In addition, audit may be unidirectional or bi-directional, in either a single or dual audit environment. Of course, a system can be envisioned wherein one telephone number is utilized to 10 perform audit functions on both the vending machine and payphone systems, which may be desirable if the entire apparatus is owned by a single entity.

An integrated payphone and vending machine apparatus according to the invention can utilize several 15 payment alternatives depending on the type of payphone installation and use contemplated. For example, if a "smart" telephone set is being used, full flexibility for accepting coins and bills with change payback can be offered, or restrictions on change pay-back can be 20 provided. In a coin line "dumb" or "bright" set implementation, the opportunity to accept bills and pay change exists for "initial rate" calls as the initial rate is set in the "dumb" or "bright" sets. For other calling situations, it would not be easy to pay change 25 without additional electronics added to the system to hear the requested amount from the operator. None the less, bill acceptance would be possible. In all cases,

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set contains the means to store and communicate audit information, which includes a modem for telecommunications.

Fig. 6B is a simplified block diagram depicting 5 another alternative component configuration for the apparatus 600 of Fig. 5. The vending machine controller 620 is connected directly to the telephone line 604 and to a modem 618. The connection of the controller 620 to the telephone line may be through a standard telephone 10 interface jack or by other means known in the art. All payphone functions, payment and audit functions are thus performed by the controller 620, which is directly connected to additional telephone circuitry 614 including handset 603. As described above, the controller 620 is 15 also connected to a keypad 611, a display 617, payment system 606, vending circuitry 621, and mode switch means 615. The use of a single controller 620 to control all operations of the apparatus 600 maximizes the use of shared resources such as processing power, memory and 20 electrical power, while also including the use of "bright" or "smart" telephone electronics. Further, a single keypad 611 is used to place telephone calls, and to make vend selections.

For the apparatus described above, audit functions 25 can be performed on the payphone, or on the vending machine, or both. The system can be designed to have dual audit capability wherein payphone audit data is

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delivery area 612. The vending machine operates to dispense items in a manner described above, and may provide change by means of a coin return slot 613. Also included on the front panel of the apparatus 600 is a 5 mode switch button 615 and a display means 617.

Fig. 6A is a simplified block diagram of one configuration of components for the apparatus 600 of Fig. 5. A vending machine controller 620 is connected to the payment system 606, to vend circuitry 621 which include 10 the actuators used to dispense items chosen by a consumer using vend keypad 611, a mode switch means 615, a display 617, the telephone circuitry 614 which includes an electronic controller, and a modem 618. The vending machine controller 620 emulates the signals associated 15 with coin insertion for proper operation with the telephone circuitry 614. The telephone circuitry 614 performs payphone functions directly on the telephone line 604 as if it was a standalone payphone. The vending machine controller 620 keeps audit information by 20 monitoring the payment system 606 and from monitoring the switchhook of the payphone 602. A separate modem 618 controlled by the vending machine controller 620 handles audit communications with the central office. An alternative configuration of the embodiment shown in 25 Figs. 5 and 6A would utilize a "bright" telephone set. Utilization of such a "bright" telephone set also permits the use of a common payment system 606, but the "bright"

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lines are likely used and thus, a "dumb" or a "bright" telephone set could be utilized in the apparatus. The vending machine operator could enter into a contract with the regulated phone company to service the payphone and 5 to collect the revenues. The phone company, which owns the telephone line, would receive revenues minus a commission paid for services provided by the vending operator. Such an arrangement is attractive for the vending machine operator because the phone company also 10 pays for the payphone and telephone line. Thus, the capital costs of the vending machine are reduced. Further, the regulated phone company could supply audit system services to the vending operator for a fee, or the vending operator could use the telephone line to tie into 15 his own vending machine audit system.

Fig. 5 depicts another embodiment of a payphone and vending machine apparatus 600 according to the invention. A standard "dumb" telephone set 602 which uses a coin line 604 is installed in the vending machine 20 housing 601. The coin chute normally present in the payphone 602 is replaced by the payment system 606 which can accept bills through a bill slot 607, coins through a coin slot 608 or cards through a card slot 609. The payphone 602 includes a handset 603 and keypad 605. The 25 apparatus 600 also contains a variety of snack items visible behind a glass panel 610 which can be chosen using a selection keypad 611 to dispense an item into a

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The apparatus 1 can also be designed for committed use of either the payphone or the vending machine. An off-hook sensor can be utilized to ensure that all payments are made to the payphone while it is in use, 5 thus preventing a simultaneous vending operation. When the payphone is on-hook, then all payments would be directed to the vending machine. Of course, the payphone could be set for priority use as described immediately above unless a vending mode switch is depressed to 10 indicate vending use. After a vend, which could be sensed when a vend motor or actuator returns to its home position, the apparatus 1 would reset to phone payment priority. Such operation would thus enable payment priority, and thus operation priority, to be assigned to 15 either the payphone or the vending machine, depending on depression of a switch.

The method of operation of the vending machine and payphone apparatus may depend on the owner of the apparatus. For example, an IPP company would own and 20 operate the machine for its own benefit using business lines. Thus, a "smart set" payphone would be used in conjunction with the vending machine components. The present invention allows the IPP company to reduce its investment and simultaneously increase revenues. 25 Alternately, a vending machine operator could provide the "real estate" for a regulated phone company to house their payphone. In this case, coin telephone

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of separately tracking the amount of money owed for the telephone call while monitoring the amount of money being inserted to perform a vending operation. An optimum implementation of such a system would include a single
5 controller to combine the functions of the "smart" or "bright" set with the functions of the vending machine.

An alternative mode of operation is to preset the apparatus 1 such that vending machine functions have priority with respect to payments except when the
10 payphone is being used. Thus, if the payphone handset is on-hook then a customer merely inserts payment and makes a vend selection without the need to depress a mode switch. If the handset is off-hook, which can be determined by a sensor or by monitoring the hook switch,
15 then a priority means such as a vend and/or a phone selection button can be used to direct the payment. For example, before making payment to perform a vending operation while the payphone is in use, a customer would have to depress a vend priority button, otherwise the
20 apparatus would assume that payment was being made in order to continue the telephone call. Subsequent to the telephone call, the depression of a vending key may be required to reset the default to vending payment.
Alternately, the default could be primed to reset to
25 vending machine priority after a preset time elapses from when the handset is placed on-hook.

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coin return 16, the bill payout recess 18 or credited to an inserted electronic purse device.

Alternately, if a customer wishes to use the payphone 30 of the apparatus 1 of Fig. 1A, then she would 5 depress the payphone mode button 23. The customer then picks up handset 33 thereby releasing the hook switch from its depressed position. The phone 30 enters its off hook state, and begins to draw power to process the call. Next, the customer inserts a sufficient number of coins 10 into the coin slot 10, or inserts money into currency slot 12, or inserts a phone card or the like into card reader 14 to cover the cost of the call, and dials the number she wishes to call using keypad 35. The dialed number is transmitted to central office 31 which connects 15 the call. The customer's credit is cancelled when a collect signal is generated. The customer completes her call and then hangs up. When handset 33 is on hook, the phone 30 may perform status monitoring in its standby state using a small amount of power.

20 The above identified operation assumes the use of a "bright" telephone set in the vending machine, or may alternatively use a "smart" set. The "bright" or "smart" set receives information concerning the deposit of coins, bills or a card in payment from the vending machine 25 controller 130. Such operation can include vending a product or service while a telephone call operation is ongoing, provided that the vend controller 130 is capable

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handset. Handset 33 is further connected to a handset detector circuit 430. The DTMF decode circuit 395, the DTMF generator 321, the modem 400, the first and second switches 405 and 420, the level adjust 410, the handset 5 detector 430, and the notch filter circuit 470 are all further connected to microcontroller 506 and the monitor system 510.

As its name implies, the monitor system 510 monitors the status of the phone. Typically monitor 10 system 510 draws its power from power supply 230. Normal operational power for the payphone circuitry 38 is preferably derived from the vending machine power source, but may originate from the tip and ring lines.

In one possible mode of operation, a customer 15 approaching the apparatus 1 of Fig. 1A in order to purchase a can of soda would depress the vend mode button 27, then deposit coins or bills of particular denominations in the slots 10 or 12, respectively. The customer may also insert an electronic purse device, or a 20 debit or credit card in the card acceptor 14 to initiate a transaction. Once sufficient payment credit has accrued, the customer may select a product to be dispensed using the selection switches 2. A corresponding product delivery apparatus will then 25 dispense a soda can to the product delivery area 4 where it may be retrieved by the customer. Any resulting change from the transaction may be paid out through the

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and ring lines which are offset by the DC voltages supplied by the central office 31. The processing element 500 comprises a real time clock 502, memory 504 and a microcontroller 506, and aids in processing the 5 telephone line signals. The processing element 500 may control all the operations of the phone circuitry 38 including audio network 380, and power supply 230 in cooperation with the controller 130. Microcontroller 506 may also record the status of the phone 2 and has the 10 capability of initiating communications during the standby mode if that status warrants it. Alternatively, the controller 130 may control some or all of the payphone functions.

Audio network 380 may comprise a large number of 15 interconnected blocks under the control of microcontroller 506. For example, the speech network 390 may be connected to a DTMF decode circuit 395 and the keypad 35. Further, the speech network 390 may be connected to an audio balance circuit 480, a first switch 20 405, and a notch filter circuit 470, a modem circuit 400, which is connected to a first switch 405 and a second switch 420. As shown, the notch filter circuit 470 is connected through a low pass filter (LPF) circuit 415 to the second switch 420. The second switch 420 is also 25 connected to a microphone in the handset. First switch 405 is connected to a level adjust circuit 410 which is in turn connected to an ear piece which is part of the

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circuit 38, and to money acceptance means, such as a coin validator 110 and a bill validator 100. During operation of the payphone, a consumer inserts bills and coins into the money acceptance means which generate output signals 5 used by the controller 130. The controller 130 translates the output signals into payment signals recognizable by the telephone control circuit 38 to enable payphone operation. For example, when a dollar bill is validated, the controller 130 translates the 10 signals generated by the bill validator 100 into a number of equivalent coin signals.

Referring again to Fig. 4, the power supply circuit 230 is DC connected to a power supply circuit 260, and to an audio network 380. More specifically, 15 power supply 230 provides power to a DTMF decode circuit 395, a speech network 390 and to a standard DTMF keypad or a matrix keypad, which is presently preferred for use as the keypad 35 of FIG. 2. The power supply circuit 230 in conjunction with control signals from a processing 20 element 500 may control the provision of all power for the phone circuitry. Power for all the digital electronic components requiring a DC power supply is provided through supply 230 to the DC power supply 260. When the audio network 380 is powered up, it provides the 25 pay phone 30 with the capability of transmitting and receiving speech and audio tone signals. These signals are transmitted and received as AC voltages on the tip

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in U.S. Patent No. 5,167,313, which is assigned to the assignee of the present invention.

The processors 230 and 310 provide data concerning the currency types and denominations of accepted coins 5 and bills to the controller microprocessor 400. Based on this data, the microprocessor 400 computes a corresponding credit value and controls the dispensing of a product by the vend dispensing circuit 410, or controls telephone call processing if sufficient credit is 10 available. Similarly, the microprocessor 400 communicates with the card reader 14 to arrive at a credit value for a transaction.

The vend dispensing circuit 410 may be any vend dispensing circuit known in the art, including the 15 circuit described in U.S. Patent No. 4,785,927. A product will be dispensed by the operation of a selected vend actuator (not shown) that receives signals from microprocessor 400 based on the available credit and the selection made by the customer via the selection switches

20 2.

FIG. 4 depicts a block diagram of one suitable embodiment of a telephone control circuit 38 for use with the invention. A line interface circuit 55 comprising a ground lifting relay circuit 160 and an off hook detector. 25 circuit 190 connects the tip and ring lines from the central office 31 to a power supply circuit 230. The controller 130 is connected to the payphone control

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may provide display information to the display 20 and/or provide information for the audio-speaker 19.

The microprocessor 400 executes program code stored in memory, such as the ROM memory 414, to control 5 the operations of both the vending circuitry and the payphone circuitry. Conversion or exchange rate information, pricing information and other service data may be retained in the EEPROM memory 416. Intermediate or temporary data generated by the microprocessor 400 10 during a vend transaction or a telephone call may be retained in the RAM memory 412.

The processor 230 controls the operations of the coin mechanism 110 in the acceptance testing of coins, and the processor 340 controls the operations of the bill 15 validator 100 in the validation of bills. During acceptance testing of a coin, the processor 230 receives information signals generated by coin sensors and processes the received information by comparing it with acceptance criteria stored in the memory 420. In a 20 similar manner, the bill validator processor 340 receives information signals from various banknote sensors and then validates a bill by comparing the generated signals with bill acceptance criteria stored in the memory 430. The bill and coin acceptance criteria may consist of 25 ranges of values corresponding to properties of valid accepted bill or coin denominations of currencies. One suitable arrangement of acceptance criteria is described

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memories 412, 414 and 416 via data and address lines 415.

Alternative suitable processors for the controller 130 include microcontrollers, programmable logic arrays, application specific integrated circuits and the like.

5 The memories 412, 414 and 416 may be random-access memory (RAM), read-only memory (ROM) and electronically erasable-programmable read-only memory (EEPROM), respectively. These memories may reside in one or more integrated circuit chips. The three memories 412, 414
10 and 416 are shown for exemplary purposes only. The present invention may include any number of application suitable memory types.

The microprocessor 400 communicates with the payphone circuitry 38, the mode switch means 21 and 25, a
15 vend dispensing circuit 410, the service input/output port 170, the card acceptor 14, the bill payout device 115, and the processors 230 and 340 of the coin mechanism 110 and bill validator 100, respectively. The processors 230 and 340 are also shown connected to corresponding
20 memories 420 and 430 within the coin mechanism 110 and bill validator 100. The memories 420 and 430 may be ROM, RAM or EEPROM type memories or a combination of memory types suitable to perform currency accepting operations. The microprocessor 400 may also receive signals from the
25 selection switches 2, service switches 150 and the service keypad 160. In addition, the microprocessor 400

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FIG. 2 also depicts a card reader 14 on control panel 6 connected to the controller 130 via the lines 140. As explained above, the card reader 14 may be capable of reading credit cards, phone cards, debit cards 5 or chip cards in order to vend a product or service or to permit use of the payphone 30. In addition, a display 20 and item selection switches 2 are shown connected to the controller 130.

In addition, FIG. 2 depicts a cut-away side view 10 of a payphone 30 shown connected to the housing 3 in FIG. 1A. As shown, payphone 30 has a handset 33 resting in cradle 37 in the on-hook position, keypad 35 and phone cord 34, which are accessible to a customer. The payphone 30 is connected to telephone circuitry 38 which 15 is housed inside the apparatus 1 such that it is inaccessible to customers. The telephone circuitry 38 is connected to a telephone line 32 and to the microcontroller 130 via line 39.

FIG. 3 is a simplified block diagram showing the 20 electrical connections of elements of one suitable vend controller 130 with the various system components shown in FIG. 2. Similar components in FIGS. 2 and 3 are numbered alike for clarity, for example, the display 20 and the card reader 14. In FIG. 3, the components 25 contained in the transaction controller 130 of FIG. 2 are depicted within a dashed outline 135 and include a processor, such as a microprocessor 400 connected to

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Similarly, any bill validator capable of discriminating the unique characteristics of paper currency may be used as the bill validator 100 of FIG. 2. Alternatively, the apparatus 1 may employ multiple bill 5 validators. Suitable bill validators 100 include those described in U.S. Patent Nos. 4,628,194 and 5,222,584, which are also assigned to the assignee of the present invention. For purposes of this disclosure, it is sufficient that the reader recognizes that inserted 10 banknotes or bills are typically transported by rollers and belts past optical, magnetic or mechanical sensors, or a combination thereof, such that signals are generated. These signals are used by a microcontroller to validate and discriminate the bill. An unacceptable 15 bill may be driven in the reverse direction so that it is returned to the customer via the banknote insert slot 12. An acceptable bill may be diverted to the bill stacker 105 or to the bill escrow and payout unit 115. The microcontroller provides information concerning the 20 bill's currency type and denomination to the vend controller 130 over the communication lines 140 of FIG. 2. An alternative configuration may use a bill validator 100 that only stacks accepted bills in the stacker 105 or provides such bills to the cash box 120. In such a 25 system, a separate pre-loaded bill payout device, controlled by the vend controller 130, may be utilized to payout change.

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components disposed behind the control panel 6 are not accessible to customers of the apparatus 1 and may only be accessed by service personnel.

Any coin mechanism capable of validating coin 5 denominations may be used as the coin mechanism 110 in FIG. 2. In the alternative, an apparatus 1 according to the present invention may utilize multiple coin mechanisms. Coin mechanisms suitable for use in the present invention are known in the art. Examples of 10 suitable coin validation mechanisms are disclosed in U.S. Patent Nos. 3,844,297, 3,870,137, 4,106,610, 4,361,218 and 4,367,760, which are assigned to the assignee of the present invention. For purposes of this disclosure it is sufficient that the reader recognizes that inserted coins 15 may be accepted, denominated, totalized, and directed to the cashbox 120 or to coin tubes (not shown) so that change may be dispensed. Conversely, an inserted coin may be rejected and returned to the customer via coin return 16. In particular, when a coin is inserted into 20 coin slot 10, it will be directed down a coin passageway 117 past one or more coin sensors (not shown) that generate various electrical signals indicative of coin authenticity and denomination. These signals are provided to a microprocessor or microcontroller in the 25 coin mechanism 110, which is connected to the vend controller 130 via the communications lines 140 shown in FIG. 2.

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A cash box 120 is also connected to the coin mechanism 110. The bill validator 100 is connected to a bill stacker 105. The coin mechanism 110 and bill validator 100 are capable of discriminating coins and bills of 5 different denominations and are discussed in greater detail below with respect to FIG. 3.

A bill escrow and payout unit 115 may be positioned adjacent the bill payout recess 18 and would be connected to the bill validator 100. Such a bill 10 escrow and payout unit 115 is capable of dispensing bills as change through the bill payout recess 18. During operation, the bill validator 100 may divert deposited acceptable bills to the bill escrow and payout unit 115 to replenish its supply of bills for change. Suitable 15 bill escrow and payout units 115 include those disclosed in U.S. Patent No. 5,076,441, as well as others known in the art.

For ease of reference and understanding, the bill validator 100, coin mechanism 110, bill escrow and payout 20 unit 115, card acceptor 14, selection switches 2 and display 20 are shown connected to a vend controller 130 by communication and power lines 140. The controller 130 may further be connected to data entry devices, such as DIP switches 150, a keypad 160, an input/output port 170, 25 as well as a display 180 to facilitate entering and updating of prices and other information, and for servicing of the apparatus 1 by service personnel. The

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payphone mode switch 21 contains an icon 22 intended to convey to a customer that, in order to use the payphone, the button 23 should be depressed. Similarly, the vend mode switch 25 contains an icon 26 intended to convey the 5 message that a customer should depress button 27 if a vend product is desired. The icons 22 and 26 may be transparent, semi-transparent or translucent artwork images and may be backlit so as to attract the eye of a customer. A more detailed explanation of the operation 10 of the mode switches 21 and 25 is set out below. It should be understood, however, that the apparatus could be designed to incorporate a single payphone mode switch instead of two separate mode switches. For example, the top selection switch of the plurality of selection 15 switches 2 could be designated as a payphone mode switch that must be depressed before a call can be made.

In order to fully understand the operation of the apparatus 1 of FIG. 1A, it is helpful to have a basic understanding of the components found within the payphone 20 and vending machine apparatus. FIG. 2 is a partial cutaway side view, not drawn to scale, of the apparatus 1 showing a typical component layout along the control panel 6. A bill validator 100 and a coin mechanism 110 are attached to the rear of the control panel 6 adjacent 25 the bill insert and coin slots 12 and 10, respectively. The coin mechanism 110 is connected to the coin return 16 and to a coin passageway 117 leading to the coin slot 10.

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telephones in wide use in "Western Electric Company"-style housings, and their equivalents in "GTE Corporation"-style housings. "Bright" sets are typically designed to replace "dumb" sets and generally add such 5 features as audit and diagnostic capability to the payphone.

In the United States, business lines are generally used by independent payphone provider companies (known as "IPP" companies). The business lines are characterized 10 by: a standard two-wire, tip and ring line interface of normal telephone lines; use of totally electronic payphone stations; collect and refund and call supervision functions managed at the payphone station; and, call rates set at the payphone station. The 15 additional features usually provided by "bright" sets discussed above are also performed by the electronic sets.

All payphone stations using business lines contain electronic circuitry to perform the tasks at the station, 20 as described above, and thus are known as "smart sets". These electronic smart sets are required because no services are performed by the Central Office for business lines. The IPP companies lease the business lines, and operate their payphone station business in a manner 25 similar to that of vending operators.

FIG. 1B depicts payphone mode switch 21 and vending mode switch 25 of FIG. 1A in detail. The

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various D.C. voltage amplitudes and polarities on the tip and ring lines. For a more detailed discussion of telephone line-powered operation, the reader is directed to U.S. Patent No. 4,926,458 which is assigned to the 5 assignee of the present invention. It should be understood, however, that an advantage of the invention is that payphone power can be supplied by the power supply of the vending machine.

The payphone portion of the invention can be based 10 on a telephone system utilizing coin lines or business lines. In the United States, coin lines are generally used by the government regulated phone service providers. Coin lines use a third ground wire, and are characterized by: collect and refund signalling from a Central Office; 15 coin line supervision, such as determining call start and call end; and, remote rate determination for other than local calls. The third ground wire is used as a reference by the Central Office to control some of the signals to the phone station.

20 The payphones currently used on coin lines are commonly known as "dumb" sets or "bright" sets. A "dumb" set is characterized by having all telephone line functions performed at the Central Office, while a "bright" set is characterized by an electronic chassis 25 which performs some functions of the "dumb" set as well as providing additional functions at the payphone station. Examples of "dumb" sets include "32C" and "32D"

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activatable message lights or other displays capable of operating in the environmental conditions to which vending machines are typically exposed. In addition, or alternatively, an audio indicator or speaker 19 may be 5 mounted on the front panel of the vending machine 1 to provide audible instructions and information. Also provided in the control panel 6 are a payphone mode switch 21 and a vending mode switch 25 which are explained in more detail below.

10 The apparatus 1 of Fig. 1A also includes a payphone 30. The payphone 30 is mounted at a height above the floor to satisfy the requirements of the Americans with Disabilities Act and so that it is within easy reach of the majority of consumers. The payphone 30 15 includes a handset 33 having a microphone and earpiece, a cord 34 connecting it to telephone circuitry (not shown) and a keypad 35 for dialing telephone numbers. The payphone 30 is connected to a central office 31 by two wires, the tip and ring lines, via a telephone line 32.

20 When not in use, the handset 33 sits in a cradle 37 such that it depresses a spring-loaded switch commonly known as the hook switch. When the handset 33 is in the rest position shown in Fig. 1A, the payphone 30 is in an "on-hook" condition. When the handset 33 is lifted out of 25 the cradle 37 then the hook-switch is no longer depressed and the payphone 30 is in an "off-hook" condition. When in the off-hook position, the central office 31 applies

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delivery area 4. Examples of suitable product delivery apparatus include vend motors, actuators and solenoids as well as other components well known in the art. Examples of such apparatus include those described in U.S. Patent 5 Nos. 4,458,187 and 4,785,927, which are assigned to the assignee of the present invention.

A control panel 6 of the system 1 contains a coin slot 10 and typically a banknote or bill insert slot 12, which accept money to initiate a vend operation. The 10 control panel 10 may further contain a card acceptor 14 to enable customers to initiate a transaction with a credit, debit or phone card. In addition, an electronic purse device in the form of a card may be inserted into the card acceptor 14 to initiate a transaction. The term 15 "electronic purse device" is used herein to denote a token or card possessing an electronic circuit, a magnetic strip or other data storing medium or circuitry, for retaining a credit value of a particular currency. An electronic purse device may be in one of a variety of 20 shapes, including a key or coin, as well as the card. Such devices may be used as currency in a variety of conventional automatic transaction systems.

A coin return 16, and possibly a bill payout recess 18, may be provided in the control panel 6. A 25 display 20 on the control panel 6 may provide instructions and information to the customer. Suitable displays 20 include dot-matrix displays, selectively

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vending machine housing, alternative embodiments are contemplated. As explained below, the payphone could be mounted aside the vending machine housing and have electrical interface circuitry to the vending machine 5 circuitry. Alternatively, the payphone could be at a location remote from the vending machine, but operate as a "slave" machine by virtue of cabled electrical interface connections to the vending machine. For example, the payphone may be near enough to the vending 10 machine housing to share money acceptance components, but the handset may be physically located apart from the vending machine housing.

Referring to Fig. 1A, an integrated payphone and vending machine apparatus 1 is shown. The apparatus 1 15 includes a variety of soft drinks in cans to be dispensed which are stored inside the housing, in an area inaccessible to customers. Other types of vending machines that could be utilized may store products behind a transparent display area, for example, a glass panel, 20 so that consumers may view the variety of products before making a selection. In the present example, each product is retained by a product delivery apparatus (not shown) inside the housing. A consumer presses one of the selection switches 2 after accruing a sufficient credit 25 amount which is accomplished by either inserting a sufficient amount of money or using a credit or debit card. The selected product is then dispensed into a

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Fig. 2 is a partial cutaway side view of the apparatus of Fig. 1A;

Fig. 3 is a simplified block diagram of a suitable vend controller system including the system components of 5 Fig. 2;

Fig. 4 is a simplified block diagram of an embodiment of a payphone control circuit;

Fig. 5 depicts another embodiment of the present invention;

10 Fig. 6A is a simplified block diagram of the components of the apparatus of Fig. 5; and

Fig. 6B is a simplified block diagram of an alternative embodiment of the components of the apparatus of Fig. 5.

15 Detailed Description

Fig. 1A depicts an embodiment of the integrated payphone and vending machine apparatus 1 of the present invention. It should be understood that, while a soft drink vending machine is shown in Fig. 1A, the present 20 invention may comprise a vending machine for dispensing snacks, confectionery, coffee, cigarettes, toiletries, phone cards, stamps or tickets and the like, or one that provides a service. The invention is thus not limited to utilization of a soft drink dispensing vending machine.

25 It should also be understood that, although the payphone of Fig. 1A is mechanically integrated into the

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rate charges every time communications are established between a vending machine and the central computer.

Summary of the Invention

The present invention is an integrated vending machine and payphone apparatus, which realizes economies due to the sharing of components and due to the shared use of a telephone line.

One embodiment of a payphone and vending machine apparatus according to the invention has a housing, an attached payphone handset, a selection means and money acceptance means. At least one controller is connected to the vending machine circuitry and to the payphone circuitry. A telephone line is connected to the apparatus and is operable for placing telephone calls, and for permitting audit functions to be performed on either or both the payphone and the vending machine. The money acceptance means is common to both the payphone and vending machine and can accept payment so that a call may be placed or a vend selection can be made.

20 Brief Description of the Drawings

Fig. 1A is an embodiment of an integrated payphone and vending apparatus according to the invention;

Fig. 1B is an enlarged view of the mode switches of Fig. 1A;

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INTEGRATED PAYPHONE AND VENDING MACHINE

Field of the Invention

The invention relates to an integrated payphone and vending machine apparatus, and methods for operating such an apparatus.

Background of the Invention

In general, it is known to connect a dedicated telephone line to a vending machine so that audit functions can be performed from a remote location. For example, U.S.

- 10 Patent No. 4,412,292 describes a system for the remote monitoring of vending machines which can communicate conditions at the vending machines over telephone lines to a central computer complex. A microprocessor module installed in each vending machine monitors a plurality of
- 15 sensing points and is connected to telephone line. In operation, the microprocessor may be programmed to access the telephone line at predetermined intervals to call the central computer, and may also be programmed to call when certain events occur. Although such an apparatus
- 20 monitors vending machines status, it is costly to implement and maintain. The vending machine operator must pay the telephone company to install dedicated lines to all her vending machines, and must pay telephone call

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(54) Title: INTEGRATED PAYPHONE AND VENDING MACHINE

(57) Abstract

An integrated payphone (30) and vending machine is described. A housing contains typical vending machine components such as a power supply, money accumulators, a controller, a selection device (2) and vending actuators. Furthermore, the housing also has a payphone (30) with a telephone line. The selection device (2) allows the user to chose a desired mode of operation or to enable a vend mode of operation while the payphone (30) is in use. The integrated payphone (30) and vending machine permits the optimization of an audit system for monitoring both the vending machine and payphone (30) utilizing a telephone line. The apparatus is cost effective because many components, such as the money accumulators and power supply can be shared by both the payphone (30) and vending machine.

